

ABSTRACT

Devices and methods for optical processing and storage are described. In a preferred embodiment, an integrated optical gate matrix, that includes a set of nonlinear elements and waveguides interconnecting at least some nonlinear elements
5 in the set of nonlinear elements, may be configured to enable optical processing. A first subset of the set of nonlinear elements is preferably configured to function as a set of ON/OFF switches in the "OFF" state to enable a second subset of the set of nonlinear elements to be configured in at least one optical processing configuration. Configuration of the second subset of the set of nonlinear elements may be used for
10 various optical processing operations, such as all-optical 2R or 3R regeneration, wavelength conversion, data format conversion, demultiplexing, clock recovery, logic operations and dispersion compensation. Related apparatus and methods are also described.